

**The digestive system :**

The digestive system of mono gastric animals is composed of :

1- Alimentary tract (gut) : mouth, pharynx, esophagus, stomach, small intestine (duodenum , jejunum , ileum ) , large intestine ( colon & appendix ) , rectum & anus .

2- Accessory glands : salivary gland , liver with gall bladder & pancreas (exocrine portion) .

The mouth is contain teeth, tongue, & saliva. The tongue is consist of several taste buds that are responsible for sensation of different tastes ( sour, salty, sweet & bitter tastes ).

**\* The functions of the mouth :**

A- mastication ( chewing ) of the food by teeth, tongue & aid of saliva.

B- other functions are related to saliva: the pH of the saliva = 7. The important functions of it are :

1. due to presence of mucin the saliva aids of mastication & also aids of specking by facilitating the movement of lips & tongue.
2. moist the mouth & keep the mouth and teeth clean & have antibacterial action.
3. serve as solvent for the molecules within food & stimulate the taste buds.
4. play minor role in starch digestion as :



**\*The function of the pharynx :** Is swallowing of the bolus by stimulation of swallowing reflex .

**\*The function of esophagus :**

Ducts the bolus from pharynx to the stomach by peristaltic movement of it's wall & aids of it's mucous secretions.

**The stomach: secrete :**

- 1- mucin
- 2- HCl
- 3- intrinsic factor

**\*The function of gastric mucin :**

- 1- facilitate introduction of the bolus to the stomach .
- 2- protect the stomach epithelium from effects of HCl & enzymes within gastric juice .

**\*The functions of gastric HCl :**

1. Kill many ingested bacteria .
2. Stimulate flow of bile & pancreatic juice .
3. Provide necessary pH for pepsin to start protein digestion .

**\* The function of intrinsic factor :**

Facilitate the absorption of vitamin B12 in small intestine.

**The small intestine : The mucosa of small intestine (duodenum) is secrete :**

- 1- serous fluid with neutral pH = 6.5- 7.5 which is rapidly reabsorbed by villi & then supply a watery vehicle for absorption of substances from chyme .
- 2- mucin
- 3- several enzymes as :
  - + peptidase .
  - + oligosaccharidases ( sucrase, maltase, lactase ) .
  - + small amount of intestinal lipase

Most of food digestion is occur inside duodenum & then absorbed inside all three parts of small intestine ( duodenum, jejunum & ileum ). The remaining is moved from ileum to colon through ileocecal valve .

**\*The main function of ileocecal valve:**

Is to prevent the backflow of fecal contents from colon to ileum

**The large intestine:** is colon ( ascending, transverse,& descending ) . The epithelial cells contain no enzymes & lined with goblet cells that secrete the mucus .

**\*The main function of the colon :**

1. absorption of water, Na<sup>+</sup>& other minerals inside proximal half of the colon .
2. storage of the feces inside distal half of the colon until it can be expelled.
3. synthesis of certain vitamins as vit. K &vit. B by the normal flora bacteria.

**The rectum :**

When the mass movement forces the feces into the rectum , the desire for defecation is normally initiated including reflex contraction of the rectum & relaxation of the anal sphincter.

**The liver :** Is the largest gland in the body , has many complex functions as :

❖ - Vascular functions for storage & filtration of the blood.

❖ - Metabolic functions as :

1. *metabolism of the carbohydrates :*

- a. storage of glycogen .
- b. conversion of galactose& fructose into glucose.

2. *metabolism of fats :*

- a. formation of lipoproteins & large amount of cholesterol & phospholipids .
- b. conversion of large amount of CHO & proteins to fats

3. *metabolism of proteins :*

- a. formation of plasma proteins .
- b. formation of urea for removal of ammonia from the body fluids .

4. *other metabolic functions :*

- a. storage of vitamins : vit. A, vit. D &vit. B12
- b. formation of clotting factors: prothrombin, factor VII & accelerator globulin .
- c. detoxification or excretion of different drugs, hormones & Ca<sup>2+</sup> ions into the bile .

❖ - Secretion of the bile : which have important Function in digestion of fats

**The pancreas :** Is composed of :

**A- Endocrine tissues (islets of Langerhans ) that are secrete hormones as insulin & glucagon.**

**B- Exocrine tissues that secrete the digestive juice to the duodenum. The pancreatic juice contain enzymes for digestion of all types of food ( proteins , fats & carbohydrates ).**

***The enzymes of pancreas are :***

**1. Proteolytic enzymes as :**

- \* *trypsinogen***
- \* *chemo trypsinogen***
- \* *ribo nuclease***
- \* *deoxyribo nuclease***

**2. Enzymes for fat digestion as :**

- \* *Pancreatic lipase***
- \* *cholesterol esterase***

**3. Enzymes for carbohydrates digestion as :**

- \* *pancreatic amylase.***

**The digestion :**

**Is breakdown & conversion of the major food stuffs of proteins, fats & complex carbohydrate into absorbable units .It is required large numbers of digestive enzymes that found in saliva, stomach, exocrine portion of the pancreas & cytoplasmic membrane of the cells lining small intestine ( duodenum ) .**

